



POLICY BRIEF



The role of citizen science in improving ambient water quality

Sustainable Development Goal Target 6.3

Prepared by the World Water Quality Alliance – ‘Citizen Science for SDG indicator 6.3.2’ workstream

Key message

International recognition of the need for global action on water is building. In 2023 the UN Water Conference made it clear that water is essential for the achievement of the Sustainable Development Goals, and for the health and prosperity of people and planet. But that progress on water related goals and targets remains alarmingly off track. The 2024 United Nations Environment Assembly (UNEA 6) resolution on Effective and inclusive solutions for strengthening water policies - (UNEP/EA.6/L.13) makes clear that the collection of water quality data needs to be enhanced and used for evidence-based decision making and informed water resource management.

Despite the awareness that good ambient water quality is crucial for human survival, it is alarming how little information about the quality of water in lakes, rivers, and groundwater is available globally. Urgent action needs to be taken if we want to understand and protect our water supplies. **This brief calls for international policy makers and local communities to work together to monitor and improve water quality using a readily available approach – citizen science. Without immediate adoption, the authors believe that Sustainable Development Target 6.3 will not be met.**

The challenge of water quality monitoring

Without data and information on water quality, we cannot understand how much water is available for domestic use, what risks are associated with using this water, or what water treatment capacity is needed now and into the future as climate changes. We currently monitor water quality in less than 1% of the world's lakes. Although the lack of data makes it impossible to provide a similar figure for rivers and groundwater, the situation is likely just as bleak. We need an urgent solution.

Many communities around the world take water directly from ambient sources for domestic use without treatment. Where water is treated, poor water quality places additional pressure on treatment processes which can be expensive and carbon-intensive. Climate change is likely to exacerbate existing water quality issues. It is imperative that we understand the quality of our raw water resources and do our best to protect them.

Through UNEP's latest water quality assessments using SDG indicator 6.3.2, a clear picture emerged of the capacity of national authorities tasked with monitoring and assessing their freshwaters to fulfil their role. In the 2021 Progress Report, a clear link was established between Gross Domestic Product (GDP) per capita and the freshwater monitoring capacity of national authorities: It emerged that low-income countries are reporting on only a small fraction of their total freshwater bodies. This means that without these data on water quality, the scientific basis for protection and restoration activities is missing.

This report also made clear that despite a wealth of water resource monitoring data in high-income countries, poor water quality was still reported. This illustrates that while water quality monitoring data are an essential prerequisite for management of water resources, the collection and assessment of such data does not mean

that good management is inevitable - these data are only one piece of the puzzle. For water quality to be protected or improved all stakeholders must have a voice and means to provide input and engage in action to rectify or rehabilitate water resources.

Citizen science as a solution

Citizen science is a wide-ranging term that refers to the involvement of non-professional scientists in any stage of the scientific process. It is a scientific research method, a form of stakeholder engagement, and an approach to improving inclusiveness and justice.

Citizen science data are widely used in global and local biodiversity monitoring, and already directly contribute towards achieving SDGs 14 (Life Below Water) and 15 (Life on Land). In addition to data provision, citizen science is also providing opportunities for public engagement and education, making better use of local knowledge, increasing support for decision making processes, and promoting inclusion and more just access to science.

Many citizen science projects provide data on both surface and groundwater, including monitoring of the chemical and biological parameters detailed in SDG indicator 6.3.2. Several countries are now adopting citizen science as part of their routine monitoring programmes, e.g., Sierra Leone, Zambia and the United Kingdom. Outcomes of this integration include increased availability of higher spatial and temporal resolution of data, greater participation of local people in water resource management, and improved public education and awareness regarding water-related issues. Therefore, there is huge potential for citizen science to be applied directly to monitor ambient water quality (SDG indicator 6.3.2) while simultaneously increasing the participation of local communities in water resource management (SDG target 6b).

Pathways for Action

Monitoring ambient water quality using citizen science requires three basic preconditions to be met:

1. Data can be produced that meets the requirements of indicator 6.3.2.
2. Citizen science participants are willing and able to collect the data.
3. There is an enabling framework that allows both the participants and the data they produce to be incorporated into integrated water resource management.

Conventionally, data used for indicator 6.3.2 reporting

are collected by or supervised by the national authority responsible for monitoring and managing the country's freshwaters. This is not typically the case for citizen science initiatives, which are commonly either run by, or involve, third parties. **National authorities wishing to incorporate citizen science into their water monitoring and management regime can a) receive data from citizen science projects run by third parties, b) run their own citizen science projects, or c) a mixture of both.** Fig. 1 shows a checklist of questions that should be addressed before implementing or supporting any citizen science activity.

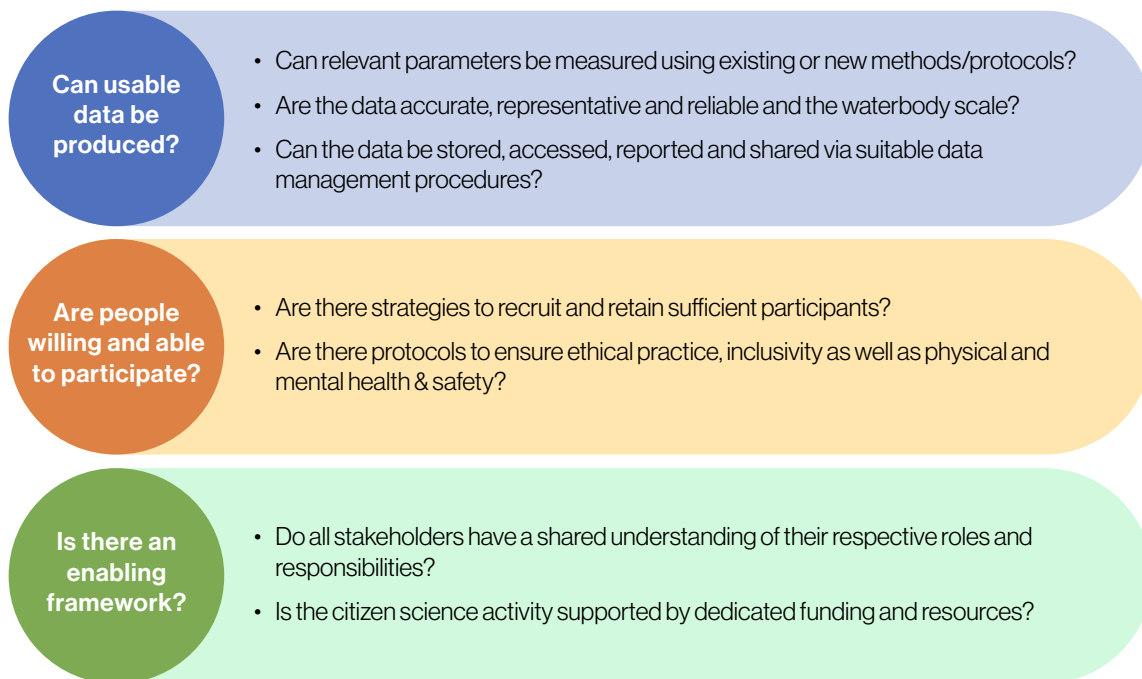


Figure 1. Checklist of requirements for using citizen science for monitoring indicator 6.3.2

There is no 'one-size-fits-all' approach to citizen science, and we propose four action pathways that are based on availability of both national and citizen data. These are summarised in Fig.2 and described more fully with examples in the associated [Technical Brief](#).

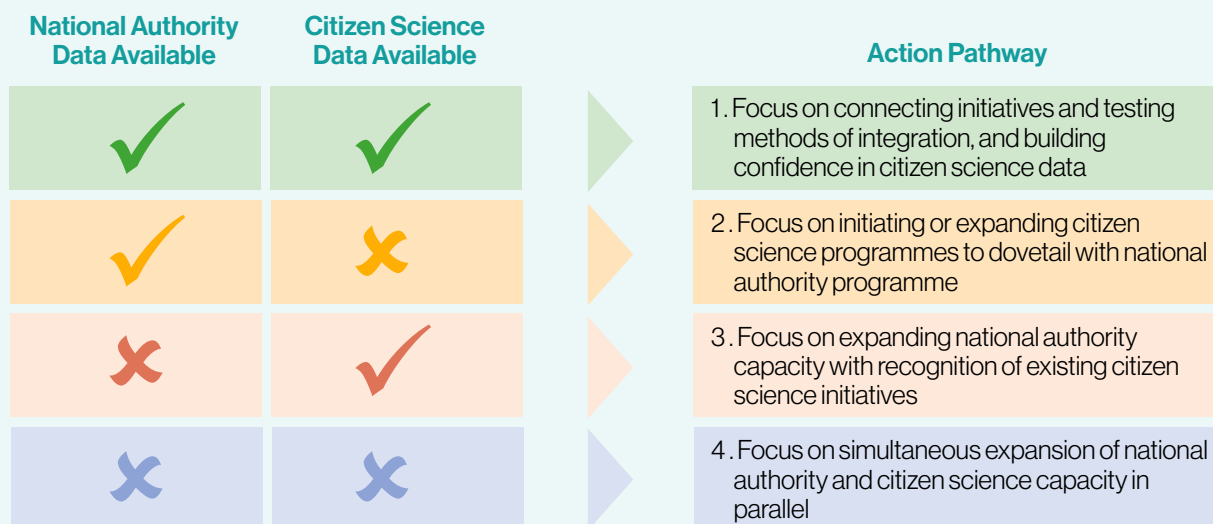


Figure 2. The four starting points based on data availability within national authority and citizen science initiatives, and how these relate to the four action pathways

How to incorporate citizen science into your national water quality monitoring programme

Our experience suggests that integration of citizen science and national authority monitoring requires deliberate action. We urge national authorities to work with citizen science project coordinators and community organisations to do the following:

1. Nominate a focal point within your institution to explore the potential of citizen science for water resource management.
2. Task them with:
 - a. Finding out which action pathway is best suited to your situation
 - b. Appraising your national monitoring capacity as reported through indicator 6.3.2 (available on the [SDG Water Quality Hub](#))

- c. Exploring which citizen science projects have the most potential for your national context (examples are available in the accompanying [Technical Brief](#))
3. Consider the resources needed for implementation, including scientific design, strategies to promote engagement and collaboration with volunteers, and the overall framework that allows national authorities and citizen scientists to share data and work together.

Citizen science has the potential to revolutionise the way we manage water resources to improve water quality by making information readily available to those who need it most. We just need to mobilise it.

For more information, please refer to the accompanying [Technical Brief](#) [HERE](#)

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